Editorial: Can Science Explain the Near-Death Experience?

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ABSTRACT: Science is a tool for answering empirical questions; it is not designed to address ontological or teleological issues such as the ultimate reality and meaning of the near-death experience (NDE). There are, however, a number of empirical questions about NDEs that can be explored by the scientific method. Scientific study poses risks both to NDErs and to our understanding of the NDE itself. However, because the NDE allows us unique access to information about consciousness and death, those risks are outweighed by the benefits to NDErs and to humanity derived from a scientific description of NDErs.

As a scientist, both by training and by temperament, I find myself in a rather strange situation, albeit one of my own making. I have spent much of my creative energy and time over the past 15 years studying the near-death experience, a phenomenon that can hardly be put into words, let alone examined under a microscope. Fortunately, I am not alone in the scientific pursuit of something that seems paradoxically immune to scientific inquiry. In fact, considering the lack of respect and funding for such research, there is a surprisingly large community of scholars united in this pursuit.

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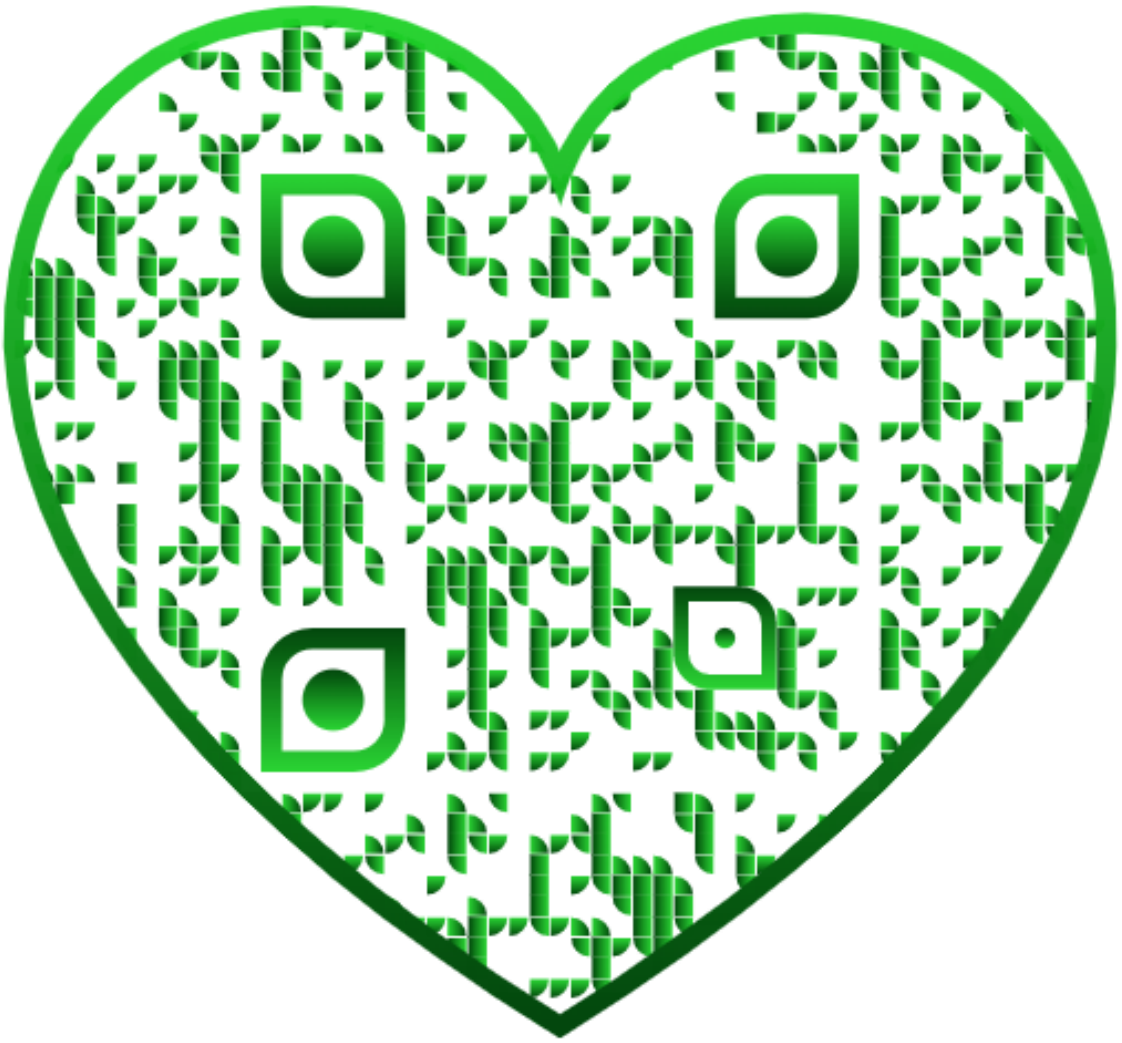

I will not dwell on why a scientist finds phenomena like near-death experiences (NDEs) interesting. Quite a lot has been written lately about why NDEs fascinate us, in this Journal and elsewhere; what much of it boils down to is that scientists, like other people, want to know what life is all about, what death is all about, what we are all about, what God is all about, what the universe is all about. And the NDE, a manifestation of consciousness at the interface between life and death, promises answers to those riddles.

Instead, I'd like to address two more critical questions central to scientific near-death research. The first is the title of this paper: *Can* science explain NDEs? The second is very different but equally important question: *Should* science explain NDEs?

What is Science?

Let me start by addressing what we mean by "science"—not a simple matter. Isaac Asimov has written a highly literate summary of the historical progression of science from mythology to deductive logic to inductive reasoning (Asimov, 1972). I'm going to elaborate briefly on that progression in order to spell out the implications for scientific near-death research of why science developed as it did, and why it needs to keep evolving further.

Mankind has always sought answers to questions. Some of these are practical questions, such as "What plants are good to eat?" It's fairly easy to see the value of seeking answers to that kind of question. But we've also sought answers to abstract questions such as "Why is the sky blue?" It's not quite so obvious why we keep asking questions like this, but whatever our reasons, it seems as though seeking answers is an integral part of being human. At first our answers were intuitive or spontaneous. Depending on your perspective, they were either made up by the creative imagination or derived from supernatural inspiration or divine revelation; but they had no grounding in either logic or empirical observation.

For example, according to an ancient Greek myth, cold weather lasts six months each year because Persephone ate six pomegranate seeds while she was in Hades; according to a Wyandot Indian myth, leaves turn red each autumn because the Bear's blood drips down on them from the heavens where he was gored by the Deer's antlers. Imagination or revelation may have produced answers that were psychologically satisfying, but they didn't allow us to predict new information or new answers based on what we already knew.

The Greeks changed all that for Western civilization. To myth-makers, the gods and spirits who controlled the universe were as fickle as people. The Greek philosophers were the first to conceive of the universe as a machine governed by constant, impersonal laws. With this world view, instead of being at the mercy of the gods, we could now decipher the laws of nature and predict the course of events.

In trying to discover the laws of the universe, the Greek philosophers assumed that those laws are in fact constant, and also understandable. They assumed that there was an ideal, perfect, and orderly universe, and that if we could discover its rules we could predict every action.

The tool the Greeks developed for discovering the laws of nature was deductive reasoning. Starting with what seemed to be obvious truths, like "the shortest distance between two points is a straight line," certain consequences must follow logically. For example, we start with the absolute truths that all men are animals and that all animals must eat to live, and from those two truths, we logically deduce that all men must eat to live.

Deduction is a wonderful tool for mathematics, and with it the Greeks developed the geometry that we still use today. But because of that success, they came to regard deduction as the only acceptable way to learn about the universe. And before too long, that attitude led to serious problems.

First, there are some pieces of information that can't be deduced from abstract principles. For example, you can't deduce the number of readers of this Journal from basic truths; they have to be counted, or observed in some way. The Greek system of deductive logic recognized pure mental reasoning from the basic truths as the only source of new information; it did not respect empirical observations, which can be wrong, since they are based on our imperfect senses and not on the absolute truths. For example, if we observed that a certain man could survive without food, the Greek philosophers would say that our observation must be wrong, because it contradicts the logical deduction.

The second problem with deduction from basic truths is that, as you get further afield from geometry, it gets less clear what those basic truths are. In astronomy, the Greeks started with basic absolutes such as "all heavenly bodies orbit around the earth in perfect circles," and proceeded to reason deductively from there.

When accurate astronomical observations, such as the timing of eclipses, disagreed with logical deductions, the observations had to be thrown out, because the basic truths and the rules of logic were perfect, while our instruments and senses are subject to all kinds of error. So, while logical deduction allowed us to predict new information and new

answers based on known truths, it was limited in the types of questions it could answer, and if the basic assumptions were wrong, then the answers too would be wrong, despite the perfect method.

Only in the last 400 years have we started valuing our senses as a source of scientific truth. Renaissance scientists turned the Greek philosophers' deductive logic upside down and developed a new logic called induction. Instead of assuming basic truths and then deriving conclusions from those truths, induction starts with making observations and then derives generalizations or basic truths from those observations.

For example, we start with the observations that if fish don't get food, they die; and that if birds don't get food, they die; and that if dogs don't get food, then they die; and we induce from these observations the generalization that all animals must eat to live. For the first time, then, we sought new information by conducting experiments, that is, making observations.

The Greeks' deductive scientific method assumed that there was a perfect, ideal world; our physical world was merely an imperfect approximation of that reality. The new inductive scientific method, on the other hand, assumed that our physical world was the real world; and our generalizations are merely imperfect approximations of the truth. Deductive reasoning must be related to a few basic truths, and is therefore limited in scope. Inductive reasoning, on the other hand, can expand forever, as we expand our observations of the physical world.

In making the leap from deductive logic to inductive logic, science has had to abandon the idea of an ultimate truth. No matter how many observations seem to support a given generalization, we can never consider it absolutely valid, for the next observation may contradict it. For example, if we observe that a certain animal can survive without food, then the inductive scientist would throw out the generalization that all animals must eat to live.

Absolute certainty cannot exist in our modern inductive science. And in fact, as we become more sophisticated in our observations, we regularly throw away generalizations that used to be regarded as true. Inductive reasoning from newer and more valid observations continues to yield newer and more valid generalizations.

For example, 400 years ago astronomers demonstrated that planets move in elliptical orbits around the sun, and we discarded the generalization that all orbits are round. In this century, physicists observed that near the speed of light objects get shorter and heavier, and we discarded the generalization that space and time are absolute.

But just as the imagination or inspiration of the mythmakers and the deductive logic of the Greeks had their limitations, so too does our modern scientific method. If we make the mistake of regarding inductive science as the only valid source of new information and new answers, we run into the same two problems as the Greek philosophers. Just as some of their basic assumptions turned out to be wrong, so too many of our basic empirical observations are going to be wrong. The difference is that we know in advance that our senses and instruments and measuring devices are imperfect, so we shouldn't make that mistake.

And just as the Greeks' deductive logic was limited to answering certain kinds of questions, so too our modern science based on observation can only answer questions about things that can be observed. Again, unlike the Greeks, who thought there were basic truths about everything, from which they could deduce conclusions, we know in advance that some things simply can't be observed, and therefore cannot be subjected to scientific analysis.

Science then has proven to be a very practical way of answering certain kinds of questions, but it can hardly answer all our questions. As Oliver Wendell Holmes put it a century ago: "Science is a first-rate piece of furniture of a man's upper chamber, if he has common sense on the ground floor" (Holmes, 1968, Sect. V).

So with that background, let me return to the question: Can science explain near-death experiences? If the inductive method that we know as today's science is a tool for studying observable events and building generalized rules from those observations, the question "Can science explain NDEs?" becomes "Is the NDE observable?"

The NDE itself, obviously, is not something that onlookers can watch or measure. And many of what seem to be the important questions about NDEs, like "What do they mean?" or "What is the nature of the reality in the NDE?", are not observable and therefore not appropriate questions for science. The scientific method answers "how" questions, but not "why" questions. We can't expect science to address the philosophical questions about NDEs, but only the empirical questions about them.

Are there empirical questions worth asking about NDEs? I maintain that there are, and I believe that in answering some of these empirical questions about NDEs, we can refine what we think we know about the experience and clarify how we regard these events, so that it may become much easier to address the philosophical questions by other means.

The first point to make in exploring a scientific or empirical approach to NDEs is, if we can't observe the NDE itself, what can we observe? We can certainly observe the reports of what near-death experiencers, or NDErs, remember of the experiences. Of course, what they remember may not be the same as what they actually experienced, and what they choose to tell a researcher may not be the same as what they remember. In addition to what they say, we can also observe how NDErs act. So the question "Can science explain NDEs?" now becomes "Can science explain what people say and do after an NDE?"

What are those empirical questions about NDEs that are worth asking? What can scientific research tell us about NDEs? There are a number of general categories of empirical questions about NDEs; for example: (1) What do NDEs consist of? (2) What influences who will have an NDE? (3) What are the aftereffects of NDEs? (4) What practical applications do NDEs have? (5) How are NDEs similar to or different from other experiences? and (6) How reliable are NDE reports?

A number of scientific studies have been conducted in an attempt to answer these questions. The first category of empirical question I mentioned was "What do NDEs consist of?" When your restate this question in operational terms, it becomes "What do NDErs report the NDEs to consist of?" Within that general category, there are a number of issues that science can address. The first is: Can NDEs be broken down into a few meaningful components or parts?

When I first began this work 15 years ago, I read what had been written up to that point by the early pioneers of near-death research, such as psychiatrists Raymond Moody and Russell Noyes and parapsychologist Karlis Osis. I collected from that early literature more than a hundred different features—feelings, sensations, encounters, and events—that had been reported as part of an NDE. Through a process of collecting reports from hundreds of NDErs and refining those reports through statistical techniques, which are just another type of observational instrument, I was able to describe the NDE as containing four separate parts (Greyson, 1983b).

I labeled these four component parts: (1) a Cognitive Component, including time distortion, thought acceleration, life review, and sudden understanding; (2) an Affective Component, including feelings of peace, joy, and cosmic unity, and an experience of a brilliant light; (3) a Paranormal Component, including enhanced vision or hearing, apparent extrasensory perception, precognitive vision, and an out-of-body experience; and (4) a Transcendental Component, including encounters with an apparently unearthly realm, a mystical being, and visible

spirits and a barrier or "point of no return" that, had the NDEr crossed it, would have precluded his or her return to life.

Obviously, not all NDEs include all of these features, but all NDEs can be described as having so many Cognitive elements, so many Affective elements, so many Paranormal elements, and so many Transcendental elements. Furthermore, each individual NDE can be classified as to whether it is *predominantly* a Cognitive, Affective, or Transcendental experience. (As it turns out, almost no NDEs are predominantly Paranormal.) The importance of this is that when we compare NDE reports with physiological and psychological variables, we can look at these distinct parts separately (Greyson, 1985).

Another question about what NDEs consist of is: Do the different parts of an NDE unfold simultaneously, or in some temporal sequence? Psychologist Kenneth Ring formulated a model of the NDE unfolding in five sequential stages: peace, separation from the body, the tunnel, seeing the light, and entering the light (Ring, 1980). Looking at the NDE in temporal stages is quite different from looking at separate parts of the NDE. Which way of looking at the experience is right?

Again, the leap to a science based on induction meant giving up the idea that any of our conclusions represents an absolute truth. From the observations—what NDErs tell us—we build generalizations that are imperfect models of the way things are. There is no meaning to the question of which model is the right one, since they aren't intended to be truths. The only meaningful question is how helpful these models are in predicting new information and new answers. Temporal stage models can predict some new information, and component models can predict other information.

As an analogy, consider our scientific models for understanding the behavior of light. One model that pictures light as a particle, or photon, predicts some events, like the casting of shadows. Another model that pictures light as a wave predicts other events, like the diffraction of white sunlight into multicolored rainbows. The photon model doesn't predict rainbows, and the lighwave model doesn't predict shadows, so science regards both models as incomplete.

Instead, the scientist searches for more comprehensive models: for example, a model that pictures light as being *sometimes* a wave and *sometimes* a particle, or a model that pictures light as "wavicle," with some properties of waves and some properties of particles. But until we develop a more useful single model, we're left with multiple models of light, each of which is useful for predicting different phenomena about light.

The same may be true for NDEs. Perhaps a temporal stages model

will be more helpful in predicting some features of NDEs, and a parallel components model more helpful in predicting others. But inductive science views *all* models as just models, rough approximations of reality that are never right or wrong, but only approximations that are closer or farther from the truth.

We can also ask empirical questions about different parts of the NDE, about different kinds of NDEs, and about NDEs in different people. For example: What paranormal or mystical elements occur in NDEs? How do unpleasant, negative, or hellish NDEs differ from others? How do NDEs vary among different cultures? Cross-cultural studies have tended to support the similarity of the basic near-death experience across a wide range of societies, but such studies are few in number and generally have included too few cases to provide definitive comparisons.

Within our own culture, we can ask how NDEs differ among different segments of the population. Larger studies of NDEs, such as those of Ring (1980, 1984) and cardiologist Michael Sabom (1982), categorizing subjects by age, sex, race, religious and educational background, have never shown any effect of these variables on either the frequency with which people report NDEs or on the type of experiences they report.

The second category of empirical question I alluded to above was "What influences who will have an NDE?" To answer these questions, we need not only a group of near-death experiencers, but a "control group" of people who have not had NDEs. For my research, I anticipated a control group of people who came close to death but did not report NDEs. In the process of recruiting such a control group, I unexpectedly came across two further groups of subjects.

The first unanticipated group consisted of those who claimed to have had NDEs, but whose descriptions of what they experienced scored close to zero on an instrument like my NDE Scale. Did those people have NDEs, or didn't they? *Something* happened to these people that made them label their experiences as NDEs, but in the interest of research I kept them in a separate group.

The second unanticipated group consisted of those who denied having had an NDE, but whose descriptions of what did happen when they came close to death scored quite high on the NDE Scale. Did *these* people have NDEs, or didn't they? Despite their experiencing many of the common features of NDEs, something prevented them from labeling their experiences as NDEs. Again, in the interest of research, I have kept these people in a separate group.

How NDErs compare with the control subjects on a variety of variables can then tell us what factors influence who will have an NDE,

and, by looking at the separate parts of the NDE, can tell us what factors will determine who will have what kind of an NDE. Furthermore, including in the analysis my two unanticipated groups of ambiguous NDErs can tell us what factors will determine who will label an experience as having been an NDE and who will be reluctant to do so.

Several factors that might potentially influence the NDE can be observed. We can ask, for example: What sociocultural variables influence the NDE? How do religious beliefs and practices influence the NDE? As I mentioned above, none of the larger studies of near-death experiences so far have shown any effect of these variables. We can also ask how previous paranormal or mystical experiences might influence the NDE. My own research has found that such experiences are no more or less common in NDErs *before* the NDE than they are in the general population (Greyson, 1983a).

We can also ask: How do prior expectations of death and dying influence the NDE? Again, research that I carried out with psychiatrist Ian Stevenson showed no effect of prior expectations of death or an afterlife, and no effect of prior knowledge about NDEs (Greyson and Stevenson, 1980). And how do circumstances of the close brush with death influence the NDE? No particular way of approaching death has yet been shown to lead to any particular type of NDE. However, it does seem to matter whether a close brush with death was sudden and unexpected, such as in many accidents and heart attacks, or whether it was possibly anticipated, such as in suicide attempts or complications of surgery.

My research has shown that sudden, unexpected near-death events lead to roughly equal numbers of Cognitive, Affective, and Transcendental experiences. However, Cognitive NDEs—where time distortion, thought acceleration, life review, and sudden understanding are more prominent—tend not to occur in people who had expected to die and had had time to prepare for it (Greyson, 1985). While I hadn't anticipated that finding, it makes sense: you're more likely to survive a sudden unexpected accident if you stop time, think faster than usual, and acquire sudden insights. On the other hand, people who expect they may die soon often review their lives in preparation for death, so that a life review during the near-death event becomes unnecessary.

We can also ask how physical details of the close brush with death influence the NDE. What effect does brain functioning have, as measured by EEGs? Though a number of writers have reported anecdotes about NDErs who recovered from "flat EEGs," no physician or scientist has yet published a firsthand report with EEG findings. What is the effect of level of consciousness? My own research has suggested that

the occurrence of NDEs in a near-death situation is not related to alteration or loss of consciousness (Greyson, 1981).

We can ask more specific questions, such as: How does anoxia, as measured by blood levels of oxygen, influence the NDE? Though skeptics often attribute NDEs to anoxia, Sabom, who alone has reported actual levels of blood gases, in NDErs, found no effect of anoxia (Sabom, 1982). How do endorphins, morphine-like compounds produced in the body under stress, influence the NDE? Again, endorphins are widely implicated in theories of NDEs, but they are extremely difficult to measure directly. However, in some emergency settings comatose patients are given narcotic antagonists, which would block the effect of endorphins. By studying the incidence and type of NDEs in people who have been given these drugs while close to death, we might infer the role of endorphins in NDEs.

The questions we can ask about the effects of drugs on the NDE are limited only by the number of different drugs available, but we can ask generally: Do drugs seem to influence the occurrence or type of NDE? Once again, while a number of drugs can produce states that have features in common with NDEs, studies of near-death experiencers by Sabom (1982), by Karlis Osis and Erlendur Haraldsson (Osis and Haraldsson, 1977), and by myself (Greyson, 1981) have concluded that NDEs occur *less* often when people near death are given drugs.

Perhaps the ultimate question we can ask about the near-death event itself is: Is it even necessary to come close to death to have an NDE? Melvin Morse and his colleagues did find that children who were near death reported NDEs quite frequently, while equally sick children who were not near death did not report any NDEs (Morse, Castillo, Venecia, Milstein, and Tyler, 1986). However, studies of adult NDErs, including my own (Greyson, 1981), those of psychiatrists Glen Gabbard and Stuart Twemlow (1984), and those of Stevenson and his colleagues (Stevenson, Cook, and McClean-Rice, 1989) have suggested that NDEs may be as common among people who *think* they are near death as they are among people who actually *are* near death. In fact, Stevenson's group has suggested, perhaps tongue in cheek, that we call these events "*fear*-death experiences." It seems clear that being near death is not the only trigger for an NDE-like experience; it may just be the most reliable trigger.

We can also ask: How does the individual's personality influence the NDE? Though the studies of Gabbard and Twemlow (1984) and of psychologist H.J. Irwin (1985) suggest that people who have out-of-body experiences tend to be psychologically healthy, very little work has been done on personality traits of near-death experiencers per se.

Psychologists Thomas Locke and Franklin Shontz found no differences in intelligence or personality between a small group of NDErs and a control group who had come close to death (Locke and Shontz, 1983). Preliminary research that I conducted with psychologist James Council showed NDErs score higher than control groups on measures of "absorption" and "fantasy-proneness," two related traits that measure the ability to focus attention narrowly, and on imagined or internal stimuli (Council and Greyson, 1985).

The third category of empirical question that I mentioned earlier is: What are the aftereffects of NDEs? How do NDEs influence personality traits? How do NDEs influence attitudes and beliefs? How do NDEs influence apparent psychic abilities? What parts of the NDE exert these aftereffects? How long do these aftereffects last? This has proven to be the most fertile area of near-death research, for two very different reasons.

The first reason is practical: since the occurrence of NDEs can't be predicted, investigators can't often be there when they occur, but can only study them retrospectively, when the only available data may be the NDErs' recollections. Aftereffects, on the other hand, since they predictably follow the NDE, can be studied prospectively as they evolve, and can often be observed by others.

The longterm effects of NDEs to increase spirituality, concern for others, and appreciation of life, while decreasing fear of death, materialism, and competitiveness are well documented in books by Ring (1984), Sabom (1982), sociologist Charles Flynn (1986), psychologist Margot Grey (1985), P.M.H. Atwater (1988), and numerous articles by these authors and many others, including Russell Noyes (1980, 1981), Martin Bauer (1985), and myself (Greyson, 1983c). Ring's work in particular is notable for his systematic interviewing of "significant others" who can independently confirm the NDErs' claims of altered attitudes, traits, and lifestyles.

The second reason that studying the aftereffects has been the most fertile facet of near-death research is that it is also the most meaningful facet. The NDE itself, striking though it may be, does not sound to the investigator all that different from hallucinations or dissociative states. Its aftereffects, on the other hand, are uniquely profound, pervasive, and permanent, totally unlike the aftereffects of any phenomenologically comparable experience. NDEs are seed experiences, and it is only by studying the fruits that eventually grow from those seeds that we can understand their full meaning.

And we can go further, asking questions about the aftereffects on people other than the NDErs themselves: How do NDEs influence

marriages or other relationships? While this is a largely unstudied area, Atwater (1988) has documented profound "ripple effects" on those close to the NDEr. And how do NDEs influence people who hear or read about them?

While it had been speculated in the infancy of near-death research that hearing about NDEs might make suicide more attractive to some people, psychologist John McDonagh (1979) actually found the exact opposite effect: suicidal patients reading about NDEs as a result found life more meaningful, and suicide less appealing. And Flynn (1986) found that teaching college students about NDEs tended to instill some of the same changes as having an NDE.

Finally, we can ask: How do NDEs influence society? On this point we have no data, but Ring (1984) and philosopher Michael Grosso (1985) have argued that the personal transformations brought about by NDEs are precisely what are needed now on a planetary level to avoid global catastrophe.

The wider influence of NDEs on others leads directly into the fourth category of empirical question that I mentioned: What practical applications do NDEs have? What do NDEs and their aftereffects tell us about how we can better help dying patients—including those comatose; about how we can better help grieving families; about how we can better help suicidal people; and how the beneficial effects of NDEs can safely be induced or replicated?

The fifth category of empirical question was: How are NDEs similar to or different from other experiences? For example, how do NDEs compare with out-of-body experiences occurring in other settings? Gabbard and Twemlow (1984), in making just this comparison, found the NDE to contain no single unique element, but rather a unique pattern of features, most prominent being its profound aftereffects. And how do NDEs compare with mystical experiences that occur in other situations, or with other experiences of "alternate realities"?

In my studies of suicide-induced NDEs, psychiatric patients used many of the same words to describe their NDEs as they did to describe their psychotic or drug-induced hallucinations; yet they insisted that those experiences were in fact nothing at all like the NDE. My data suggest that the mentally ill have neither more nor fewer NDEs than the mentally healthy (Greyson, 1981); and for both groups, the NDE is an experience unlike anything else they have known.

In comparing NDEs to comparable events, we can also ask how NDErs' impressions of death and an afterlife compare with purported evidence of an afterlife from other sources, such as alleged mediumistic communications and reincarnation memories.

And finally, the sixth category of empirical question that I mentioned earlier was: How reliable are NDE reports? How similar are recountings of the same NDE? How does hypnosis or sodium amytal influence recall of NDEs? How does prior knowledge of NDEs influence the NDE report? How does the interviewer influence the NDE report? How does the NDEr's motivation influence the NDE report? Many factors may make an NDEr more willing or less willing to talk about an NDE, or to disclose certain aspects of it.

While my studies show that NDE accounts are remarkably reliable over time (Greyson, 1983b), and not influenced by previous knowledge about NDEs (Greyson and Stevenson, 1980), there is no doubt that an interviewer's encouragement or hostility can markedly influence what an NDEr will reveal. As there is some evidence that NDErs benefit from sharing their experiences with others, the question of how to encourage that sharing becomes a very practical one with therapeutic as well as research implications.

In summary, then, there is a wide range of questions about NDEs, important questions I believe, that can be answered by observations of what NDErs do and say after their experiences.

I asked above "Can science explain the NDE?" I then briefly outlined what science is and what an NDE is; what's left is to emphasize what an explanation is. The inductive scientific method explains things only in terms of how they seem, and how they seem to work. It doesn't explain things in terms of ultimate meaning or purpose or absolute reality. Given that limitation, I think that science not only can explain the NDE, but is well on its way toward that goal.

Having now argued that science *can* explain NDEs, I want to address briefly the thornier question of whether science *should* explain NDEs. I think clearly it should, but I also have mixed feelings about the question, and there are times when I'm not so sure of the answer. Let me start by playing devil's advocate, and list the reasons why science perhaps shouldn't try to mess with the NDE.

First is the concern about how we'll use what we learn about NDEs scientifically. Science is without values. Scientific information and conclusions have given us tremendous power over our planet, but no guidance as to how to use it. Our industrialized society, blessed with four centuries of phenomenal discoveries and material progress, is plagued by the runaway consequences of that progress: polluted air and water, overpopulation, manmade diseases, the threat of nuclear war, depletion of our limited energy reserves and of the earth's ozone layer and in fact its very crust.

When you consider the tremendous power the NDE has to transform

the individual NDEr, do we really want to give scientists access to that kind of power? The NDEr comes away from the experience with a deep spirituality and a sense of values and priorities. Will the scientist?

Author and physician Walker Percy had a character in his novel *Love in the Ruins* recite "The prayer of the scientist if he prayed, which is not likely: Lord, grant that my discovery may increase knowledge and help other men. Failing that, Lord, grant that it will not lead to man's destruction. Failing that, Lord, grant that my article in *Brain* be published before the destruction takes place" (Percy, 1971, pp. 7–8).

Secondly, will a scientific explanation of the NDE violate its very nature? Empirical science proceeds for the most part by breaking things down into their component parts. Many NDErs insist that a basic message of the NDE is that things can't be broken apart without losing their essence, that in fact what we usually see as individual objects, including ourselves, are in fact parts of a whole, and that we can only appreciate our own selves by realizing the whole and ceasing to think of ourselves as separate individuals. Can you explain a forest by studying individual leaves and twigs? Can a verbal recitation of the sequence of musical notes convey the essence of a symphony?

Finally, how will scientific study of NDEs affect individual people? Will it encourage NDErs to think of themselves as different from others and isolate themselves? Will it make them feel violated or degraded by having an ultimately unexplainable part of themselves subjected to a superficial attempt at explanation? Will explaining the positive aspects of NDEs and their aftereffects make nonNDErs intolerant of NDErs' human frailties?

These are difficult questions, and since many of them deal with abstractions that are not observable, I don't have answers for them all. But I do have a counterargument for why science should—indeed, why science must—try to explain NDEs. Again, it's based not on observations, but on an assumption. That assumption is that NDEs are meaningful experiences and not mere physiological accidents, and that by studying the changes NDErs undergo, we can learn from them how to help others.

Scientific explanations of NDEs can help individual NDErs come to terms with what happened to them, and figure out how to make the most of that experience. Scientific explanations of NDEs can help dying people prepare for what lies ahead, can help grieving families live again after the death of a loved one, and can help suicidal individuals find meaning in their lives.

Only if NDEs can be explained in scientific terms will they be accepted and respected by those health care providers who need to

understand them in order to help their patients, by the policy makers who decide how we order our priorities, and by society at large, which is so enamored of the scientific method.

The scientific method, with its limitations, is the best method we have for establishing something as being consistent and reliable enough to be meaningful to others. A near-death experiencer may not feel the need for science to explain the NDE, but a scientific explanation of the NDE is the only way of extending the benefits of NDEs from the individual NDEr to nonNDErs and to society at large.

And finally, science must try to explain the NDE because therein lies the key to its own growth. I started this paper with a brief account of the evolution of our search for answers: from mythmaking to deductive science to inductive science. Each of those advances came about because the existing method for answering questions had met its match, and new techniques had to be developed to account for our increasing knowledge of the universe.

But inductive science obviously is not the ultimate tool; we are painfully aware of its limitations. History tells us that only in trying to explain phenomena currently beyond its reach does science evolve new methods.

I believe the NDE is one of those puzzles that just might force scientists to develop a new scientific method, one that will incorporate all sources of knowledge, not only logical deductions of the intellect, and empirical observations of the physical, but direct experience of the mystical as well. But that is another story.

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